DETAILED ACTION

(1)

Applicant's Amendment filed August 6, 2009, has been entered. Applicant amended claims 22-23, 25-26, 28-34, 36, 40, 43 and 44, cancelled claims 24, 27, 35, 37-39, 41 and 42 and added claims 45-50. No new matter has been added.

(2)

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 22-23, 25-26, 28-34, 36, 40, 43 and 45-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (JP 10241707 A) in view of Wilkinson et al. (U.S. Patent No. 6,413,664) and Wilson et al. (U.S. Patent No. 6,255,012).

With respect to **claim 22**, Takahashi teaches a fuel cell comprising a structured plate comprising a distribution structure for distributing a medium wherein the distribution structure has a plurality of elastic portions of outwardly reducing stiffness and wherein the elastic portions are perpendicular to the plane of the structured metallic plate. Figure 1, Paragraphs 9 and 11. Although Takahashi teaches that the distribution structure can distribute a medium, Takahashi is silent as to whether the distribution structure is in the form of a continuous channel.

However, Wilkinson, which deals with fuel cell separator plates, teaches that fuel cell plates can be equipped with continuous channels that fluidly connect the fluid inlet

and outlet. Col. 1, Lines 54-64. Implicit in this disclosure is that continuous channels allow for the continuous distribution of media in the cell.

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of invention to configure the distribution structure taught by Takahashi into a continuous channel because Wilkinson teaches that doing so allows for the continuous supply of fluid between a fluid inlet and outlet.

Additionally, Takahashi and Wilkinson, as combined above, are silent as to whether the bipolar plate is metal.

However, Wilson, which deals with metal bipolar plate assemblies, teaches that the plates can be made from metal because of its use as a material allows for low-cost manufacture. Col. 1, Lines 44-46.

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of invention to construct the plate taught by Takahashi and Wilkinson, as combined above, from metal because Wilson teaches that doing so allows for low-cost manufacture of fuel cell components.

With respect to **claim 23**, Takahashi, Wilkinson and Wilson, as combined above, teach the continuous channel is disposed on both surfaces of the plate and that the distribution structure, as taught by Takahashi, allows for a media tight seal. Wilson, Figure 3; Takahashi, Paragraph 14.

With respect to **claim 25**, Takahashi, Wilkinson and Wilson, as combined above, teach that the fuel cell comprises a plurality of structured metallic plates that are

secured together by surface pressing. Wilkinson, Figure 1; Wilson, Col. 1, Lines 44-46, Figure 1; Takahashi, Figure 1 and Paragraphs 9 and 11.

With respect to **claim 26**, Takahashi, Wilkinson and Wilson, as combined above, teach that the surface pressing is accomplished via clamping. Wilkinson, Figure 1.

With respect to **claim 28**, Takahashi, Wilkinson and Wilson, as combined above, teach that the distribution media is continuous and that the benefit of doing so is that it provides an uninterrupted path between the fluid inlet and outlet. Wilkinson, Col. 1, Lines 54-64. Furthermore, Takahashi, Wilkinson and Wilson, as combined above, teach the distribution structure is media tight. Takahashi, Paragraphs 9, 11 and 14.

With respect to **claims 29 to 31**, Takahashi, Wilkinson and Wilson, as combined above, teach that the distribution structure (continuous channel) is used to provide a continuous flow of fluid from a fluid inlet to a fluid outlet and that the elastic deformability of the structure allows for a media tight seal. Wilkinson, Col. 1, Lines 54-64, Figure 1; Wilson, Col. 1, Lines 44-46; Takahashi, Paragraphs 9, 11 and 14. Therefore, it would have been obvious to a person having skill in the art at the time of invention to modify the shape of the elastically deformable structure because modifying the shape would impact the type of seal that is formed during the elastic deformation. Specifically, the size of the elastically deformable distribution structure would impact the surface area of the seal that is created. Additionally, as per the MPEP 2144.04(IV)(B), changes in shape are a “matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed [shape] was significant.” Additionally, Takahashi teaches that the distribution

structure, i.e. the corrugated panel and the reactant gas channels that it forms, is a generally parabolic cross-section in the unloaded condition. Figure 1.

With respect to **claim 32**, Takahashi, Wilkinson and Wilson, as combined above, teach that the distribution structure, i.e. the corrugated panel, is deformed in the loaded condition. Takahashi, Paragraph 11.

With respect to **claim 33**, Takahashi, Wilkinson and Wilson, as combined above, teach that are silent as to whether the sidewalls of the reactance gas channels are deformed in the loaded condition; however, this feature is necessarily present. The feature is necessarily present because applying pressure to the top of an elastically deformable structure to cause the structure to deform would necessarily, even to a small degree, deform the side walls of that same elastically deformable structure.

With respect to **claim 34**, Takahashi, Wilkinson and Wilson, as combined above, teach the continuous channel is disposed on both surfaces of the plate. Wilson, Figure 3.

With respect to **claim 36**, Takahashi, Wilkinson and Wilson, as combined above, teach a fuel cell that has a separator plate that comprises, among other things, a corrugated panel (distribution portion for distributing a medium) for current collection which comprises a collection section and reactant gas channels (distribution structure). Takahashi, Figure 1, Paragraph 9. Takahashi, Wilkinson and Wilson, as combined above, further teach that when the fuel cell stack is clamped together to seal it, planar pressure becomes uneven and highly localized at the clamp position. Takahashi, Paragraph 6. In light of this, a person having ordinary skill in the art at the time of

invention would realize that modifying the material thickness of the distribution structure would make uniform the planar pressure exerted by the clamping structure. Specifically, tapering the material thickness of the distribution structure that is closest the clamping pressure points would decrease the localized planer pressure, allowing for more uniform planar pressure.

With respect to **claim 40**, Examiner notes that spring rate is a mathematical expression of the amount of weight/force needed to compress a spring. Accordingly, the greater the spring rate of an object, the more force that is needed to compress the object. Therefore, it would have been obvious to a person having skill in the art at the time of invention to vary the spring rate to manipulate how response the deformable distribution structure would be to force exerted against it.

With respect to **claim 43**, Takahashi, Wilkinson and Wilson, as combined above, teach that the distribution structure (continuous channels) can be used in a bipolar plate. Wilson, Figure 3.

With respect to **claim 45**, Takahashi, Wilkinson and Wilson, as combined above, teach a fuel cell that comprises first and second bordering elements (Takahashi, Figure 1, Feature 11) wherein a plate comprising a distribution structure is sandwiched between the bordering elements. Takahashi, Figure 1. Wilson teaches that the plate comprising a distribution structure can be a bipolar plate (Figure 3) and Wilkinson teaches that the plate can be metallic. Wilkinson, Col. 1, Lines 54-64. Finally, Takashi teaches that the distribution structure is media tight and comprises a plurality of

elastically deforming portions of outwardly reducing stiffness that are perpendicular to the plane of the plate. Takahashi, Figure 1 and Paragraphs 9, 11 and 14.

With respect to **claim 46**, Takahashi, Wilkinson and Wilson, as combined above, teach that the fuel cell stack comprises a plurality of bipolar plates sandwiched between the bordering elements wherein the plates define distribution structures and wherein each plate has a surface that is pointing away from the other plate that defines a continuous reactant distribution structure. Wilkinson, Figure 1; Wilson, Col. 1, Lines 44-46, Figure 1; Takahashi, Figure 1 and Paragraphs 9 and 11.

With respect to **claim 47**, Takahashi, Wilkinson and Wilson, as combined above, teach that the continuous reactant distribution structure comprises multiple media spaces adjacent one another separated only by the walls of said plate. Wilkinson, Figure 1; Wilson, Col. 1, Lines 44-46, Figure 1; Takahashi, Figure 1 and Paragraphs 9 and 11.

With respect to **claim 48**, Takahashi, Wilkinson and Wilson, as combined above, teach that the first and second bordering elements extend parallel substantially to the surface of the bipolar plate. Takahashi, Figure 1.

With respect to **claim 49**, Takahashi, Wilkinson and Wilson, as combined above, teach that the distribution structure in the fuel cell plate comprises a valley adjacent to a peak to form the media spaces. Takahashi, Figure 1.

With respect to **claim 50**, Takahashi, Wilkinson and Wilson, as combined above, teach a fuel cell stack wherein multiple bipolar plates in the form of metallic plates with elastically deformable media tight distribution structures are in communication with one

another. Wilkinson, Figure 1; Wilson, Col. 1, Lines 44-46, Figure 1; Takahashi, Figure 1 and Paragraphs 9 and 11. Additionally, a person having ordinary skill in the art at the time of invention would have appreciated that when the continuous channels, as taught by Takahashi, Wilkinson and Wilson, as combined above, are aligned in a stack (Wilson, Figure 3) that the distribution structure forms three channels, the individual channels formed by each respective plate and the channel formed by the combination of the two plates. Wilkinson, Figure 1; Wilson, Col. 1, Lines 44-46, Figure 1; Takahashi, Figure 1 and Paragraphs 9 and 11.

(3)

Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (JP 10241707 A) in view of Wilkinson et al. (U.S. Patent No. 6,413,664) and Wilson et al. (U.S. Patent No. 6,255,012) as applied to claims 22-23, 25-26, 28-34, 36, 40, 43 and 45-50, above, and further in view of Turpin et al. (WO 03/034530 A2).

With respect to **claim 44**, Takahashi, Wilkinson and Wilson, as combined above, teach that the distribution structure in the plate can be used as a bipolar plate bur are silent as to whether the component is used in an electrolyser or electrochemical compressor system.

However, Turpin, which deals with flow field plates, teaches that it is known in the art that fuel cells are essentially reverse electrolyzers and the structure in one is applicable to the structure in the other. Page 1, Lines 5-13.

Therefore, it would have been obvious to a person having skill in the art at the time of invention to use the fuel cell structure taught by Takahashi, Wilkinson and

Wilson, as combined above, in an electrolyser because Turpin teaches that electrolysers have the same structural features as fuel cells, the only difference being that they work in reverse.

(4)

Response to Arguments

Applicant's arguments with respect to claims 22-23, 25-26, 28-34, 36, 40 and 43-44 have been considered but are moot in view of the new ground(s) of rejection. Specifically, in the Amendment filed August 6, 2009, Applicant significantly amended the claims and introduced claims dealing with subject matter that was not previously supported. These substantive amendments to the claims necessitated the new grounds of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELI MEKHLIN whose telephone number is (571)270-7597. The examiner can normally be reached on 5/4/9.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ELI MEKHLIN/
Examiner, Art Unit 1793

/J.A. LORENGO/
Supervisory Patent Examiner, Art Unit 1793